tial dose often exceeds half the initial peak activity. 2. Tl clearance from the blood is monoexponential both after Ex and Rl with comparable decay constants and is not influenced by Ex or the time interval between Ex and Rl. 3. Based on these findings Tl can be reinjected immediately after completing Ex-images without influencing washout kinetics of Tl.

962-66 Simultaneous Dobutamine Stress Echocardiography/MIBI-SPECT for Diagnosis of Coronary Artery Disease

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Dobutamine is a pharmacological agent able to induce myocardial ischemia; for determine the relative value of Dobutamine Stress Echocardiography and 99m-Tc Sestamibi (MIBI-SPECT) for the detection of myocardial ischemia, these techniques were simultaneously performed. Forty four consecutive patients (33 males and 11 females: 50.5 ± 5.1 yrs.) were referred to our laboratories for a moderate level of pre-test probability for CAD; none of patients had prior myocardial infarction. None of patients had a severe degree of hypertension or recently presented unstable angina. All patients were in adequate pharmacological wash-out. Dobutamine stress echocardiography was performed following standard protocol; one minute before the stop of test, an injection of 740 MBq of 99m-Tc MIBI was i.v. infused. The stress MIBI SPECT imaging were acquired one hour after stress. For resting study patients were injected of 740 MBq of 99m-Tc MIBI between 24–36 h before stress. The tests were considered positive for ischemia in presence for Echo of new wall motion abnormalities and for SPECT of transient perfusional defects. Coronary angiography was performed in all patients (significant coronary stenosis ≥ 50%). The agreement between the two methods was fairly good: 74% (kappa: 0.53, $p < 0.001$). In comparison with angiography the two methods showed these level of sensitivity and specificity:

	Echocardiography	Fisher test	Scintigraphy	Fisher test
Sensitivity	75%	p = 0.007	91%	p = 0.0001
Specificity	78%		88%	
Accuracy	78%		90%	

The mechanisms of action of tests (increase of cardiac work), explains the common pathway to both ischemia or perfusional heterogeneity; besides perfusional alterations precede the development of ischemia. The relatively higher sensitivity of perfusion imaging, in comparison with echocardiography, ever since realises both in milder degree of ischemia due to single-vessel disease or in sub maximal test.

962-67 Dobutamine Stress has a Limited Value for Enhancing Flow Heterogeneity in the Presence of a Moderate Stenosis When Used in Conjunction with Tc99m-Sestamibi Imaging

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Dobutamine (DOB) is used as an alternative to exercise in conjunction with Tc99m-sestamibi (MB) SPECT perfusion imaging; however, the utility of quantitative DOB MB SPECT to enhance flow heterogeneity is not established. To validate this approach, we injected MB and radiolabeled microspheres in 6 open chest dogs during DOB stress in the presence of a flow limiting LCX stenosis (STEN). The proximal LCX was partially occluded, so as to create a 30 mmHg gradient across the STEN. Radiolabeled microspheres were injected at baseline (BASE), during STEN, and during DOB stress (10 μg/kg/min). MB was injected i.v. at peak DOB. Hearts were excised 20 min after MB injection for postmortem analysis. Hearts were cut into 96 or 192 segments for gamma well counting, for determination of myocardial MB activity and microsphere flow (μFL). The moderate stenosis resulted in impairment of CFR in response to i.c. adenosine (18 μg) during STEN (pre-STEN: 2.44 ± 0.21; STEN: 1.24 ± 0.05, $p < 0.005$) as measured by an epicardial flow probe. DOB increased heart rate significantly (Pre-DOB: 112 ± 8 bpm; DOB: 141 ± 8 bpm, $p < 0.001$), and did not significantly reduce mean aortic pressure (Pre-DOB: 80 ± 5; DOB: 95 ± 7, p = ns). Measured μFL (ml/min/gm) and MB activity for nonischemic (NI) and ischemic (IS) regions are shown below (mean ± SEM):

	IS μFL	NI μFL	IS/NI μFL	MB (%NI)
BASE	0.88 ± 0.13	0.96 ± 0.18	0.93 ± 0.02	–
STEN	0.58 ± 0.14	0.97 ± 0.11	0.59 ± 0.10	–
DOB	1.02 ± 0.37	1.87 ± 0.32*	0.52 ± 0.12#	0.70 ± 0.06†

*$p < 0.05$ vs STEN; †$p < 0.05$ vs IS/NI μFL; #p = ns vs STEN

DOB increased flow in both the NI and IS regions. Myocardial MB activity (%NI) correlated with flow (MB = 0.69FL + 0.47, r = 0.66, n = 417) when flow was less than 1 ml/min/gm. However, at higher flow ranges (1 to 4.5 ml/min/gm) MB activity did not correlate with flow (MB = 0.04FL + 0.94, r = 0.13, n = 543). This resulted in the underestimation of the relative flow deficit by MB.

Thus, DOB may have limited value for the enhancement of flow heterogeneity, since (1) DOB does not augment the flow heterogeneity in the presence of a moderate flow limiting STEN (49% reduction CFR), and (2) myocardial MB activity does not correlate with μFL at higher flows induced by DOB.

962-120 In-vivo Validation of Simultaneous Transmission-emission Protocol (STEP) for Tc99m-sestamibi SPECT — Quantitative Comparison with N-13-ammonia PET

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Variable attenuation of emitted photons is a major source of artifact and false-positivity in myocardial perfusion SPECT. To evaluate a new system for performing simultaneous transmission and emission scans to correct for attenuation, we quantitatively correlated SPECT with same-day N-13-NH3 perfusion PET. *Method:* 7 randomly selected pts underwent rest injection of 7 mCi (259 MBq) Tc99m-sestamibi. Standard (Std) SPECT images were obtained using a Prism 3000 triple-detector scanner with parallel-hole collimation. STEP images were then obtained on the same camera using fan-beam collimation and a 60 mCi Gd-153 transmission source. Two detectors acquired emission data while the 3rd obtained transmission data which was then used to produce attenuation corrected images. Following a PET Ga-68 transmission scan, same-day resting PET perfusion images were obtained with 10 mCi N-13-NH3. Std, STEP and PET sections were reformatted to short-axis sections and activity was determined in ROIs drawn in 11 segments each. Activity in each segment was normalized to the hottest segment in the volume. Maximum activity in each ROI was used to minimize partial-volume effects. 77 total segments were analyzed. *Results:* Activity in Std images correlated poorly with PET activity (r = 0.02, p = 0.84, NS). STEP segmental activity was significantly better correlated with PET (r = 0.42, p = 0.0001). Correlation was best in the apex and worst in inferior and anterior wall by both Std and STEP.

Conclusion: STEP is effective in reducing attenuation artifact in Tc99m-sestamibi SPECT and results in images quantitatively more comparable to PET.

962-121 Reliability of Q12 and Thallium Myocardial Uptake Measurements After Triphenyl Tetrazolium Chloride Staining

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A recent investigation revealed that triphenyl tetrazolium chloride (TTC) staining had a significant effect on myocardial uptake determinations of radiolabeled tracers with experimental infarction/reperfusion studies. We therefore investigated the impact of TTC staining on technetium-99m-Q12 and thallium-201 myocardial uptake in canines during infarction. Ten adult male mongrel dogs underwent a left anterior descending occlusion for 2 hours and subsequent injection of Q12 or thallium with 30 minutes of circulation. The whole heart was then excised, washed with saline, and myocardial counts were determined by a well counter. The heart was then perfused with 1% TTC stain for 5–10 minutes and then recounted. Results (expressed as μCi ± SD) are below:

	^{99m}Q12 (n = 5)	Thallium-201 (n = 5)
Pre-TTC	175 ± 57	44 ± 15
Post-TTC	173 ± 57	36 ± 11*
% Change	1 ± 1%	16 ± 12%*

*$p < 0.05$ from baseline

There is no effect of TTC staining by coronary artery perfusion on the reliability of Q12 myocardial uptake measurement but thallium-201 retention is significantly reduced. TTC staining may have an important impact on the reliability of experimental infarction/reperfusion studies using thallium-201 but not ^{99m}Tc-Q12.

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